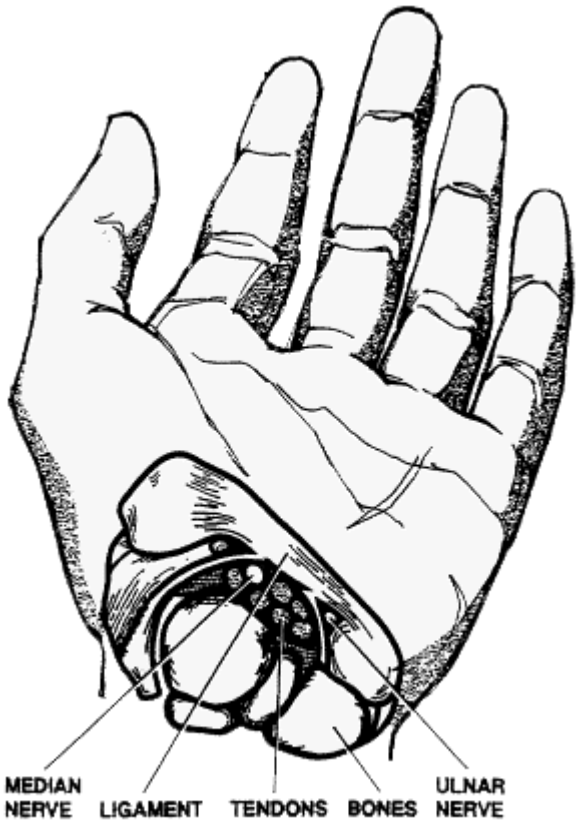
HAND AND WRIST DISORDERS

Carpal Tunnel Syndrome (CTS) is the most common upper extremity WMSD. It can lead to permanent disability if not detected early and treated properly.

Anatomy and Physiology of the Carpal Tunnel.

To understand how this disorder develops, you need to know something about the structures within the forearm, wrist, and fingers. When you perform a task using the hand, the wrist and fingers are flexed by muscles located in the forearm. Those muscles are connected to the wrist and fingers by tendons (bands of tough, nonstretchable, flexible fibers connecting the muscles to the bone).



These tendons enter your wrist through a U-shaped cluster of eight bones, the carpal bones, which form the "back" and "sides" of the wrist. Across the "top" of the wrist is a tough, strong ligament (similar to a tendon, but linking two bones together at a joint). This ligament forms the arch of the carpal bones, or the "roof" of the carpal tunnel. The median (middle) nerve of the forearm also runs through this tunnel to your palm and some of your fingers. The median nerve is compressed when your wrist is forced into an unnatural posture (such as typing on a straight keyboard) or by direct pressure on the median nerve from hard, sharp edges of work surfaces or tools. Surrounding the median nerve are the tendon sheaths (tubular sacs lined with a thin layer of tissue and a layer of oily lubricating fluid). Continued pressure and tendon activity on the tunnel can cause inflammation, which puts pressure on the nerve, and eventually results in nerve damage or CTS.

Early recognition of the signs and symptoms of CTS, and the recognition and control of any workplace risk factors contributing to the problem, should reduce the number and severity of cases of CTS. The following is presented as guidance, and should not be substituted for a professional medical examination and proper treatment of persons with possible CTS.

Symptoms

When the median nerve is compressed, the following symptoms typically appear:

- Burning pain
- Numbness
- Tingling in the thumb and first two or three fingers

These symptoms may radiate to the forearm. Sufferers frequently feel these symptoms at night, and many find performing simple tasks, such as tying their shoelaces, difficult because of weakness or numbness.

Workplace Risk Factors

Workplace risk factors associated with CTS include:

- Hands held in fixed positions over prolonged periods (e.g., installing overhead electrical wiring).
- Repeated wrist and finger flexion (e.g., operating a hand tool).
- Light, highly repetitive wrist and finger movements (e.g., typing or data entry).
- Repeated flexion or hyperextension (wrist and hand bent backwards) of the wrist (e.g., painting).
- Prolonged strenuous use of the hands (e.g., molding materials).
- Repeated pinching or grasping (e.g., inspecting materials).
- Vibration, particularly that associated with power tools.
- Bending the wrist toward the little finger (e.g., typing).
- Acceleration and velocity of dynamic motions (e.g., scanning items in a checkout line).

Prevention

Consider the following to reduce stress on the wrists and hands -

- Break-up repetitive work.
- Avoid positions at the extreme ranges of the joints. Where possible try to maintain a neutral position of the joint.
- Avoid contact with hard surfaces especially for the wrists and elbows.
- Avoid excessive force. However, even subtle forces can result is injury if performed at extreme ranges for the joints.

- Practice relaxation. Try not to use muscles to hold hands and shoulders in one position for extended periods of time.
- Use even motions… avoid jerking and snapping motions.
- Reducing exposure to suspected causes.
- Condition or train the muscles to have a better tolerance for repeated motions

For more detailed information on CTS as well as other repetitive stress injuries see http://www.engr.unl.edu/ee/eeshop/rsi.html.